

ACCESS TO BANK CREDIT AFTER CORPORATE DEFAULT*

*Diana Bonfim***

*Daniel A. Dias****

*Christine Richmond*****

1. INTRODUCTION

During the last decade the literature on the factors affecting corporate default increased exponentially. This growth was to a large extent spurred by the discussions around the implementation of Basel II.¹ However, surprisingly little is known about what happens to firms after they default on their bank loans. How many firms are able to overcome the financial distress that led to the default on bank loans? Do these firms regain access to credit? How fast is this process? Which firms have more difficulty in regaining access? In this article, we shed some light on these important questions.

In this study, we take the occurrence of defaults as given and analyse what happens to the ability of firms to access credit markets after an episode of financial distress. This is a relevant question, as not all the firms that default on their debts are economically unviable. In many cases, firms default on their liabilities due to unexpected events which do not compromise their economic viability. This question relates closely to the literature on default recoveries (Antunes (2005), Altman *et al.* (2005) or Bruche and González-Aguado (2010) are examples of some relevant contributions to this literature) but it goes one step further and asks about the ability to borrow again after an episode of financial distress.

In order to undertake this project we use a unique Portuguese dataset, the Central Credit Register (CRC), which includes data on all loans above 50 euros that were granted during the period 1995-2008. This data is shared by all financial institutions, thus mitigating the traditional asymmetric information problem between lenders and borrowers.

This project would be interesting in any context, but the recent increase in loan defaults worldwide makes it even more relevant. Even though some of the firms currently facing difficulties in honouring their debt may file for bankruptcy, many firms are expected to survive. By analysing under what conditions do firms regain access to credit, we expect to provide relevant and timely empirical evidence on this issue.

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** Banco de Portugal, Economics and Research Department.

*** University of Illinois at Urbana-Champaign and CEMAPRE.

**** IMF.

(1) In the Basel II International Capital Accord banks are allowed, under some conditions, to use their own internal credit risk models to determine capital requirements. These internal models must allow for a rigorous calculation of default probabilities, hence motivating the extensive research on credit risk modelling during the last decade.

This article proceeds as follows. In Section 2 we present a brief review of the literature on default and recoveries and in Section 3 we describe the dataset used. Our main results are analysed in two separate sections: in Section 4 we examine in some detail what is happening to firms while they are in default, whereas in Section 5 we focus our analysis on what happens to firms after they are no longer classified as being in default. In Section 6 we summarize our main findings.

2. LITERATURE REVIEW

The bulk of empirical research on default and recovery after financial distress focuses on publicly traded firms in the United States, with an emphasis on bankruptcy reorganization and liquidation procedures.² For instance, Franks and Torous (1989), Platt and Platt (1991), Bandopadhyaya (1994), Helwege (1999), and Denis and Rodgers (2007) all consider samples of publicly traded firms that file for Chapter 11 bankruptcy reorganization to analyse the effect of various regressors as well as time on the duration of default. The time in default ranges from 16-32 months on average, but size (measured by liabilities, number of employees, or number of creditors) is an important determinant of the duration of default, with smaller firms exiting sooner (Denis and Rodgers (2007), Morrison (2007)).

Post default performance of large firms appears to be poor. On average, only 29 per cent of firms in Chapter 11 bankruptcy reorganization successfully reorganize each year, but Hotchkiss *et al.* (2008) note that many of the confirmed reorganizations are, in fact, liquidation plans. Analysis of post-bankruptcy cash flows for 89 firms by Alderson and Betker (1999) corroborates earlier findings by Hotchkiss (1995), LoPucki and Whitford (1993), and Hotchkiss and Mooradian (1997) that operating margins are poor and debt ratios are above industry median levels post-bankruptcy. As a consequence of this performance, recidivism rates are high, with one-quarter to one-third of firms subsequently restructuring their debt within five years of initially emerging from bankruptcy. Acharya *et al.* (2007) also find that creditor recoveries are significantly lower when the firms in default operate in a distressed industry.

It is clear that the experiences of publicly traded US firms are not representative of the overall universe of firms, which, on average, have only 25 employees. However, few papers examine small or privately-held firms; Berkowitz and White (2004) is one notable exception. The authors consider how personal bankruptcy procedures affect small firms' access to credit in an environment where unincorporated firms debts are the liabilities of the firm owner. Therefore, if the firm fails, the owner can file for bankruptcy and business, as well as unsecured personal debts, will be discharged. Using variation in personal bankruptcy exemptions across US states, it is found that small business are more likely to be denied credit if they are located in states with high homestead exemptions, and if loans are received, the values are smaller, with higher interest rates.

Analysis on firm default and recovery outside of the US is limited, but such analysis is important since bankruptcy and liquidation procedures vary across the world. In general, Claessens and Klap-

(2) Our literature review focuses on research related to what happens to firms after an episode of financial distress. However, there are also some relevant recent papers that examine post-distress patterns amongst other borrower types, namely personal bankruptcy (Cohen-Cole *et al.* (2009) and Han and Li (2009)), commercial real estate loans (Brown *et al.* (2006)) and home mortgages (Adelino *et al.* (2009) and Haughwout *et al.* (2009)).

per (2005) find that bankruptcy filing rates are higher in countries with more efficient judicial systems. In response to different degrees of creditor protection, Davydenko and Franks (2008) find that banks in France, Germany, and the UK significantly adjust their lending and reorganization to the national bankruptcy code. At the time of loan origination collateral requirements will directly reflect a bank's ability to realize assets upon default. As a result, adjustments by banks will be able to reduce, but not fully eliminate, the effect of the bankruptcy code on default outcomes.

Evidence on the duration and severity of defaults by firms outside the US is also scarce. Franks and Sussman (2005) consider a sample of 542 small- and medium-sized financially distressed UK firms that are transferred to their bank's workout unit, finding that, on average, these firms spend 7.5 months in the bank's workout unit and 60 percent of firms in the sample operate as going concerns. Secured creditors in the country fare well within the formal bankruptcy regime and 75 per cent of small firms that default subsequently enter formal bankruptcy receivership (Franks and Sussman, 2005), while average bank recovery rates are 75 per cent as firm assets are pledged as collateral to banks in most cases. In a study of Sweden's auction bankruptcy system for small firms, Thorburn (2000) finds that three-quarters of firms are auctioned as going concerns, and the direct costs average 6.4 per cent of pre-filing value of assets, suggesting that it is an efficient restructuring mechanism for small firms. In Portugal, Antunes (2005) finds that the severity of default influences the probability of liquidation, but the number of employees is the largest determinant of the time profile of the liquidation/ recovery process.

Finally, another important dimension of the costs of default are the losses incurred directly (and indirectly) by banks. The implementation of Basel II contributed to some expansion of the literature on recovery rates and loss given default (LGD). Some recent examples are Altman *et al.* (2005), Carvalho and Dermine (2006), Bruche and González-Aguado (2010), and Bastos (2010).

3. DATA

The main data source used in this paper is the Central Credit Register (CRC), which is held and managed by Banco de Portugal. Financial institutions granting credit in Portugal are obliged to report to the CRC, on a monthly basis, all loans granted above 50 euros.³ This database includes information on loan amounts as well as some loan characteristics. It is possible to know if the loan is a joint or single liability, or if it is an off-balance sheet item (such as the undrawn amount of a credit line or a credit card). More importantly for the purposes of our study, the database includes information on loan defaults and renegotiations. All financial institutions are obliged to report data to the CRC and are allowed to consult information on their current and prospective borrowers, with their previous consent. As a result, when granting a new loan, a bank can easily observe whether the applicant has any amount of credit overdue at that moment, as well as the total amount borrowed from different banks.

Using information contained in the CRC between 1995 and 2008, we identify all firms that record

(3) Due to the confidentiality of the information used in this work, data was treated anonymously and within Banco de Portugal.

at least one episode of default during this period.⁴ In the CRC, a default can be classified as a loan with late repayment (coded as Type 7 in the database) or as a liability involving litigation (coded as Type 8).⁵ We consider that there is a default only when a firm records a loan in either of these two categories for an entire quarter. This avoids mining the data with very short-lived episodes, possibly related to reporting errors or problems in bank transfers, for instance.⁶

Our unit of observation is a firm-quarter pair. Using quarterly data for the period 1995-2008, there are more than 1 million default observations, referring to 165,165 different default episodes in more than 100 thousand firms. We consider that a firm emerges from default when it does not record a default on bank loans in a given quarter, but it was in default during the entire previous quarter. This may mean that the firm is observed in the CRC but with no records referring to outstanding defaults, or that the firm is no longer present in the CRC. This latter possibility may imply that the firm was extinguished or that the firm continues to operate but without access to bank credit.

The amount and quality of the information available are superior to that used in most papers focusing on default recoveries, which usually analyse only a limited set of publicly traded firms, and allow us to conduct a richer analysis.⁷

4. WHAT HAPPENS WHILE FIRMS ARE IN DEFAULT?

What happens after the day the bank records the first default on a firms' debt? In this section we analyse what happens between that moment and the day the default is resolved. Our analysis of default spells will focus on the time and amounts in default, as well as on the severity of default and the losses recorded by banks.

In Table 1 we present some of the main characteristics of the default episodes that we observe. During our sample period there was a substantial expansion of credit to firms in Portugal, as shown by the significant increase in the number of firms with access to loans (column 1). As discussed in Antão *et al.* (2009), the liberalization of the Portuguese financial system in the late 1980s and early 1990s created the conditions for an expansion of credit granted to the private sector. This growth was fuelled by the significant decrease in bank interest rates during the 1990s, as the economy gradually converged to meet the euro accession criteria. The participation in the euro area improved the funding conditions of Portuguese banks in international wholesale markets, with virtually no exchange rate risk, thus further contributing to improve the access of Portuguese non-financial firms to bank loans. Against this background, loans granted to non-financial firms increased by an average annual growth rate of 12 per cent during these years, reflecting not only an increase in the amount of loans granted to each firm (column 2), but also an increase in the number of firms that obtain ac-

(4) We exclude unincorporated businesses from this analysis, as their assets are not autonomous from those of the owner. For statistical purposes, these businesses are usually classified as households.

(5) For further details on this database, please see <http://www.bportugal.pt/en-US/Publicacoes/Intervencoes/Banco/CadernosdoBanco/Thumbnails%20List%20Template/Central%20Credit%20Register.pdf>.

(6) We do not include loan write-offs in the definition of default, even though this information is also available in the CRC. This choice is motivated by the fact that when a bank writes-off a loan from its books it is implicitly assuming that the probability of repayment is very small, though still positive.

(7) In Portugal there are less than one hundred publicly traded companies, while in 2008 there were more than 350 thousand firms operating in the country. This number highlights how partial and incomplete would the results be if our study would focus only on these companies.

Table 1

FIRMS IN DEFAULT: SOME CHARACTERISTICS

| | Number of firms with a loan | | Average amount outstanding | | Number of new firms with a loan | | Number of firms in default | | Amount in default | | Credit overdue ratios for firms in default | | New episodes of default | | |
|--------------|-----------------------------|--------------|----------------------------|--------------|---------------------------------|--------------|----------------------------|------|-------------------|------------------------|---|--------|-------------------------|--|--|
| | Number | Mean (euros) | Number | Mean (euros) | Number | Mean (euros) | Number | % | Mean (euros) | As a % of total credit | As a % of total credit inc. off-balance sheet | Number | Average amount (euros) | As a % of the number of firms with a loan (default rate) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | | | | |
| 1995 | 126 590 | 384 566 | 29 153 | 17 719 | 14.0 | 190 124 | 72.1 | 69.8 | 5 543 | 45 741 | 4.4 | | | | |
| 1996 | 138 471 | 382 397 | 24 530 | 18 353 | 13.3 | 188 366 | 74.7 | 72.4 | 6 634 | 64 970 | 4.8 | | | | |
| 1997 | 149 890 | 401 970 | 23 981 | 19 221 | 12.8 | 159 071 | 74.4 | 72.0 | 7 086 | 47 246 | 4.7 | | | | |
| 1998 | 165 463 | 425 245 | 26 560 | 18 854 | 11.4 | 147 865 | 74.0 | 71.6 | 6 000 | 42 107 | 3.6 | | | | |
| 1999 | 183 340 | 478 633 | 28 085 | 17 531 | 9.6 | 142 006 | 72.5 | 69.8 | 7 454 | 41 767 | 4.1 | | | | |
| 2000 | 202 693 | 534 377 | 27 440 | 19 485 | 9.6 | 118 813 | 69.6 | 67.1 | 8 213 | 24 165 | 4.1 | | | | |
| 2001 | 227 642 | 546 375 | 33 979 | 24 880 | 10.9 | 108 053 | 61.5 | 59.6 | 11 997 | 31 827 | 5.3 | | | | |
| 2002 | 253 211 | 568 362 | 35 010 | 29 122 | 11.5 | 98 057 | 59.2 | 56.8 | 15 522 | 32 089 | 6.1 | | | | |
| 2003 | 262 423 | 544 646 | 26 312 | 31 522 | 12.0 | 92 733 | 58.2 | 55.7 | 14 578 | 22 903 | 5.6 | | | | |
| 2004 | 272 855 | 523 897 | 24 253 | 33 322 | 12.2 | 83 908 | 59.9 | 57.2 | 13 353 | 24 502 | 4.9 | | | | |
| 2005 | 279 364 | 535 183 | 22 987 | 33 189 | 11.9 | 75 962 | 62.7 | 59.8 | 12 903 | 29 974 | 4.6 | | | | |
| 2006 | 288 852 | 556 805 | 25 633 | 34 440 | 11.9 | 73 246 | 60.6 | 57.9 | 14 983 | 22 058 | 5.2 | | | | |
| 2007 | 300 161 | 575 760 | 28 496 | 40 198 | 13.4 | 66 348 | 60.0 | 57.3 | 20 629 | 24 615 | 6.9 | | | | |
| 2008 | 307 840 | 608 527 | 25 442 | 45 120 | 14.7 | 74 241 | 60.5 | 57.8 | 20 270 | 35 721 | 6.6 | | | | |
| Total | 479 298 | 525 118 | 381 861 | 108 479 | 12.1 | 105 142 | 64.1 | 61.5 | 165 165 | 31 919 | 5.2 | | | | |

Sources: Banco de Portugal and authors' calculations.

Notes: Default is defined as the sum of liabilities with late repayments and of loans in litigation. We consider that there is a default only when a firm records a loan in any of these two categories for an entire quarter.

cess to credit (column 3). In fact, around 80 per cent of the firms analysed started to have access to credit after 1995Q1.

Column (4) refers to the number of firms that, in each quarter, record any amount in default and Column (5) presents the percentage of firms in default, computed as the ratio between the number of firms in default (column 4) and the total number of firms with a loan (column 1), in each quarter. We observe that this percentage had a U-shaped evolution, having decreased during the late 90s, but increasing again in the more recent years.

The average amount in default is slightly above 100 thousand euros per firm (column 6). This average amount decreased steadily during the sample period. Thus, even though there were more firms defaulting over time, the average size of the defaults became smaller. In Columns (7) and (8) we depict the credit overdue ratios for firms in default. These ratios decreased slightly during this period.⁸ Hence, even though defaults became more frequent, their size and severity decreased simultaneously.

Finally, the new episodes of default reported in columns (9), (10) and (11) refer to defaults recorded by firms without any default in the previous quarter. In column (11) we present the number of new default episodes as a percentage of the number of firms with a loan (column 1), *i.e.*, the default rate. The average amount initially in default is much smaller than the average total amount in default, as may be observed from the comparison of columns (6) and (10). Default rates peaked in 2002, possibly reflecting the increase in interest rates and the marked slowdown of economic activity after 2000 (Chart 1). The number of new default episodes and the default rate increased substantially since 2007, thus illustrating the deterioration in credit quality induced by the global financial crisis.

How long do firms stay in default? In Chart 2 we depict the hazard function, defined as the probability of a firm leaving default in the time interval $[t, t + dt)$, conditional on being in default,

$$h(t) = \lim_{dt \rightarrow 0} \frac{\Pr(t \leq T \leq t + dt | T \geq t)}{dt}$$

and in Chart 3 we present the survivor function, defined as the probability of remaining in default until t ,

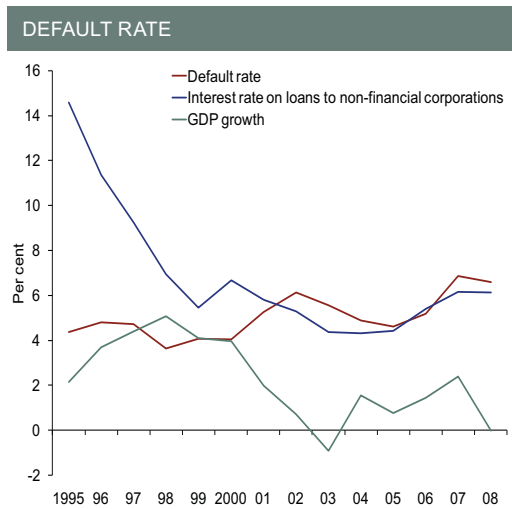
$$S(t) = \Pr(T \geq t) = 1 - F(t)$$

The exit rate from default drops sharply in the first 2 years, from around 20 per cent to slightly more than 6 per cent (Chart 2). This suggests that when a default episode is not resolved within the first quarters, then it may take a long time to be cleared. The median default duration is 5 quarters.

During the period that firms remain in default their default intensity worsens, as illustrated in Table 2.

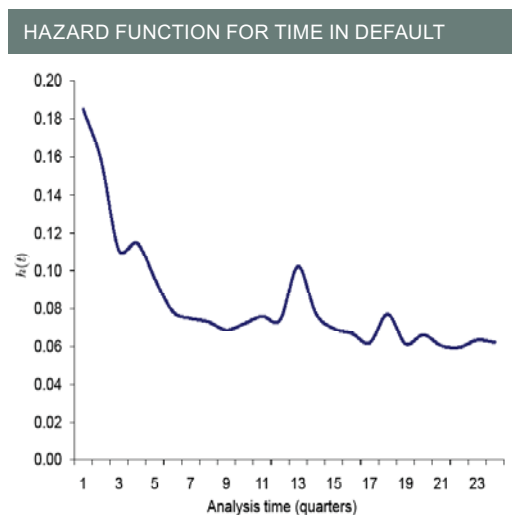
(8) In column (7), the credit overdue ratio is defined as the sum of loans in late repayment and in litigation at the end of each quarter, as a percentage of total credit granted to that firm. In column (8) this definition is extended to include off-balance sheet liabilities in the denominator of this ratio (these include the unused amounts of credit lines, for instance).

Chart 1



Sources: INE, Banco de Portugal and authors' calculations.

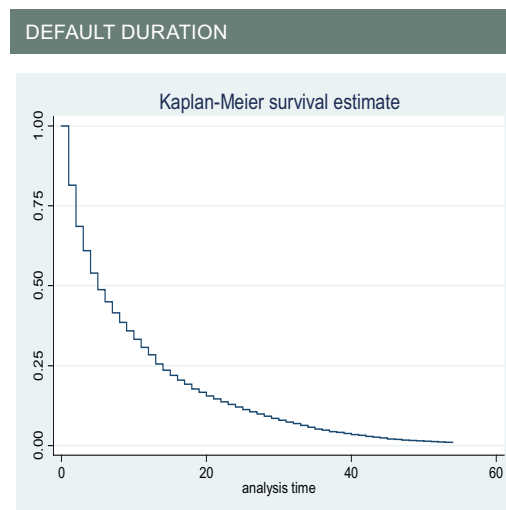
Chart 2



Sources: Banco de Portugal and authors' calculations.

Note: Analysis time defined as quarters since the beginning of the first default episode. The hazard function is defined as the probability of a firm leaving default in the time interval $[t, t + dt)$, conditional on being in default: $h(t) = \lim_{dt \rightarrow 0} \text{Prob}(t \leq T < t + dt | T \geq t) / dt$, as $dt \rightarrow 0$. In the figure, the hazard is censored at 24 quarters, covering 95% of all observations.

Chart 3



Sources: Banco de Portugal and authors' calculations.

Note: Analysis time defined as quarters since the beginning of the first default episode. The survivor estimate is defined as the probability of remaining in default until t : $S(t) = \text{Prob}(T \geq t) = 1 - F(t)$.

We observe that, as would be expected, the amount of credit overdue varies positively with the time in default. The same can be observed for the credit overdue ratio, which increases from 38 per cent of total credit when the firm first records a default, to 75 per cent if the firm remains in default for at least another year and a half. The total amount outstanding is smaller for firms with longer default spans, thus suggesting that larger firms exit default earlier.

A default does not necessarily generate losses for the banks. Indeed, when the default is originated by a small and temporary episode of financial distress, it would be expected that most firms are able to overcome such difficulties and pay back the amount overdue, eventually after some renegotia-

Table 2

| EVOLUTION OF THE FIRMS' SITUATION SINCE THE BEGINNING OF THE DEFAULT EPISODE | | | | | | | |
|--|------------------------|----------------------------------|--------|--------------------------|--------|--|--------|
| | Number of observations | Amount of credit overdue (euros) | | Credit overdue ratio (%) | | Amount of total credit outstanding (euros) | |
| | | Mean | Median | Mean | Median | Mean | Median |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Firms in default for: | | | | | | | |
| (in quarters) | | | | | | | |
| 1 | 165 165 | 31 919 | 2 870 | 37.9 | 13.9 | 375 300 | 30 170 |
| 2 | 110 208 | 48 675 | 5 000 | 49.9 | 36.9 | 327 402 | 26 302 |
| 3 | 86 674 | 63 107 | 7 071 | 58.4 | 67.3 | 315 105 | 24 890 |
| 4 | 70 016 | 77 239 | 9 510 | 64.4 | 88.4 | 307 386 | 25 115 |
| 5 | 60 348 | 87 083 | 11 220 | 69.5 | 98.9 | 296 448 | 24 753 |
| 6 | 50 377 | 96 381 | 12 450 | 72.8 | 100.0 | 332 136 | 24 773 |
| 7 | 42 618 | 106 597 | 14 690 | 75.4 | 100.0 | 291 051 | 26 115 |

Sources: Banco de Portugal and authors' calculations.

Notes: In this table are depicted firm and loan characteristics for firms that have been in default for 1 quarter (line 1), 2 quarters (line 2), etc., up to 7 quarters. In each line, the variables refer to the situation in the x quarter after the default episode began.

tion of the loan's terms and conditions with the bank. To shed some light on this issue, in Table 3 we present estimates of losses incurred by banks, based on write-offs and write-downs reported to the Central Credit Register. It should be noted that these losses do not include recovery costs and, more importantly, do not consider collateral, as this information is not available in the CRC for the period considered. Losses are displayed as a percentage of total loans outstanding after the default episode ends (*i.e.*, once the firm does not record late repayments or loans in litigation in the following quarter).

In Table 3 we present two main statistics regarding bank losses due to written-off loans. The first is the unconditional loss, that is, given all default episodes, what is the average loss incurred by the bank (columns (1) to (5)). In this case we find that on average any given default will generate a loss due to write-offs of 10.3 per cent of the total amount outstanding at the time the default episode ends. This figure is much lower than the 45 per cent loss given default rate considered for corporate uncollateralised loans in the foundation approach of Basel II. However, as we do not have information on collateral, this comparison is not straightforward.

The second statistic is the conditional loss, that is, given all default episodes that lead to a write-off, what is the average loss incurred by the bank (columns (6) to (10)). For this case, the figure is substantially higher, 33.7 per cent, but this large difference comes mainly from the fact that a large majority of default episodes do not lead to any write-off (only 30 per cent of default events generate a write-off for the bank).

Finally, when we consider only default episodes that took longer to resolve (in this case, when the default spell is longer than 1 year), we find that the unconditional loss almost doubles (18.2 per cent vs. 10.3 per cent).

Table 3

| ESTIMATES OF LOSSES INCURRED BY THE BANKS | | | | | | | | | | | | | | |
|---|----------------|-------------|------------|------------|---|---------------|-------------|-------------|-------------|--|---------------|-------------|------------|-------------|
| Bank losses due to written-off loans: including all loans | | | | | Bank losses due to written-off loans: only including events that originated a write-off | | | | | Bank losses due to written-off loans: including all loans whose default was longer than 1 year | | | | |
| N | mean | p50 | p75 | p99 | N | mean | p1 | p50 | p99 | N | mean | p50 | p99 | |
| | % | % | % | % | | % | % | % | % | | % | % | % | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | |
| 1995 | 5 880 | 2.6 | 0.0 | 0.0 | 86.2 | 553 | 28.0 | 0.01 | 9.4 | 99.6 | 3 861 | 3.2 | 0.0 | 88.9 |
| 1996 | 6 229 | 6.9 | 0.0 | 0.0 | 97.0 | 1 235 | 34.7 | 0.04 | 19.4 | 99.9 | 3 851 | 8.9 | 0.0 | 98.7 |
| 1997 | 6 778 | 4.8 | 0.0 | 0.0 | 93.3 | 1 238 | 26.0 | 0.02 | 10.1 | 99.7 | 3 925 | 6.3 | 0.0 | 96.6 |
| 1998 | 8 626 | 8.7 | 0.0 | 0.0 | 99.3 | 1 805 | 41.8 | 0.00 | 35.0 | 100.0 | 5 889 | 11.5 | 0.0 | 99.8 |
| 1999 | 6 042 | 9.1 | 0.0 | 0.0 | 99.6 | 1 215 | 45.3 | 0.03 | 38.1 | 100.0 | 3 675 | 14.4 | 0.0 | 99.9 |
| 2000 | 6 382 | 8.5 | 0.0 | 0.0 | 98.9 | 1 354 | 40.1 | 0.02 | 26.8 | 99.9 | 3 501 | 12.9 | 0.0 | 99.5 |
| 2001 | 10 614 | 9.8 | 0.0 | 0.6 | 99.9 | 3 397 | 30.6 | 0.00 | 6.5 | 100.0 | 4 906 | 17.6 | 0.0 | 100.0 |
| 2002 | 12 234 | 9.8 | 0.0 | 0.7 | 99.0 | 3 840 | 31.2 | 0.00 | 8.6 | 99.9 | 6 220 | 17.8 | 0.0 | 99.8 |
| 2003 | 11 956 | 8.4 | 0.0 | 0.4 | 99.3 | 3 735 | 27.0 | 0.00 | 4.5 | 99.9 | 5 655 | 15.8 | 0.0 | 99.8 |
| 2004 | 13 163 | 11.1 | 0.0 | 1.5 | 99.7 | 4 627 | 31.7 | 0.00 | 8.0 | 100.0 | 6 740 | 19.2 | 0.0 | 99.8 |
| 2005 | 13 662 | 14.6 | 0.0 | 2.9 | 99.9 | 5 030 | 39.7 | 0.00 | 17.4 | 100.0 | 7 000 | 26.1 | 0.0 | 100.0 |
| 2006 | 14 636 | 15.4 | 0.0 | 4.5 | 99.9 | 5 761 | 39.0 | 0.00 | 18.3 | 100.0 | 7 230 | 29.0 | 1.5 | 100.0 |
| 2007 | 15 166 | 11.5 | 0.0 | 2.6 | 99.5 | 5 686 | 30.7 | 0.00 | 8.4 | 99.9 | 5 713 | 27.8 | 4.2 | 99.9 |
| 2008 | 12 945 | 11.2 | 0.0 | 3.1 | 99.6 | 4 828 | 30.1 | 0.01 | 10.3 | 99.9 | 5 327 | 25.1 | 4.2 | 99.9 |
| Total | 144 313 | 10.3 | 0.0 | 0.8 | 99.7 | 44 304 | 33.7 | 0.00 | 11.1 | 100.0 | 73 493 | 18.2 | 0.0 | 99.9 |

Sources: Banco de Portugal and authors' calculations.

Note: Estimates of losses incurred by the banks are based on write-offs and write-downs reported by banks to the CRC.

5. WHAT HAPPENS AFTER FIRMS LEAVE DEFAULT?

There are two main possible outcomes after firms exit default: the firms can become extinct, entering liquidation, bankruptcy or being acquired; or the firms can survive and overcome the financial distress that eventually led to default. In the latter case, firms can regain access to credit or they can continue to operate without bank loans (either because they prefer to use alternative funding sources or because banks are not willing to give them credit anymore). In Table 4 we analyse these possible outcomes in the quarter immediately after default is resolved.

A default episode is considered to be resolved if there is no record of loans with late repayments or in litigation in the following quarter. We exclude firms that were in default in 2008Q4, the last quarter in the sample, as we do not have information on what happens to these firms afterwards. Column (2) considers the number of default episodes resolved as a percentage of the number of observations in default. Even though the number of default episodes that are resolved each year increased substantially during the sample period, the “exit rate” from default was relatively stable during these years.⁹

A rough estimate suggests that at least 12 per cent of the firms that disappear from the CRC after default are still operating afterwards. This estimate was conducted by searching for the firms that are not in the CRC in the 3 years after default in another dataset, *Quadros de Pessoal*. This database covers all Portuguese firms with more than 10 employees. Hence, the estimate presented is a lower bound for the number of firms that no longer have access to credit markets after default. From

(9) In 2008 the value is substantially lower than for the other years because the last quarter of 2008 was excluded from the analysis.

the 5,602 firms that cannot be found in the CRC in the 3 years after the default is cleared (considering only defaults resolved until 2006), at least 686 firms are found to still be operating, but without having access to bank loans. Given this, the maximum bankruptcy or liquidation rate after default is around 8 per cent, thus showing that most firms are able to overcome a default episode. We also find evidence of a significant recidivism pattern: almost half of the firms that overcome their first default episode record at least another default episode in the following 3 years (column 7).¹⁰

We can distinguish between two types of re-access: i) simple access (summing up columns 10 and 12); and ii) increased access (considering only column 10). In the former case, we consider that the firm has regained access simply if it continues to have access to any bank loans after the default is cleared¹¹ (we refer to this definition as “broad access”). In the latter, we consider a stricter access definition and take into account only those cases in which the firm had access to a new loan after default (“strict access”). As we do not have information on a loan-by-loan basis, we consider all cases in which the total amount outstanding is larger than that observed when the default ended.¹²

Focusing on what happens in the quarter immediately after the firms’ first default episode is resolved, we observe that the access rates depend crucially on the access definition we use. In the case of the strict access, only 13 per cent of firms were able to increase their bank credit in the first quarter after default. With respect to the broad access definition, the numbers are substantially different. In this case, 59 per cent of firms had access to credit in the first quarter after resolving the default.¹³ Hence, most firms do not face a long exclusion from credit markets as a penalty for their past defaults. Over time these two statistics had different paths. While in the case of strict access there was a fairly monotone decrease, in the case of broad access there was some volatility during the sample period: instantaneous access rates decreased until 1998, but peaked in 2002. Afterwards, there was a gradual decrease.

We consider two additional possible outcomes after default: firms that have access to loans but still record some written-off loans (9 per cent) and firms only with written-off loans, *i.e.*, no access (14 per cent). These two outcomes lie somewhere between default and access. On one hand, these firms are not technically in default. On the other hand, we cannot consider that the problems generated by the default event are fully overcome.

In Chart 4 we compare the distribution of possible outcomes after default in two different moments in time: 1 quarter (as in Table 4) and 3 years after the first default episode was cleared. The differences are significant. The percentage of firms which is able to obtain new bank loans is one of the few outcomes that remains relatively stable (13 per cent versus 11 per cent). However, when the broad access definition is considered, the percentage of firms with access drops substantially, from 59 to 30 per cent. This decrease is offset by the increase in the percentage of firms which disappear

(10) Adelino *et al.* (2009) and Haughwout *et al.* (2009) find evidence of significant recidivism problems in mortgages (the latter paper focuses on subprime loans). In both papers, the authors examine the interaction between renegotiation and the incentives for repeated defaults.

(11) In fact, most firms never lose access to credit completely while they are in default, as firms usually default only in a part of their total outstanding commitments.

(12) Given that a significant part of loans to firms has short maturities, a firm may have had access to a new loan (or loan renewal) even if the total outstanding amount did not increase. This access definition may then be too strict, thus justifying the need to consider the two alternative definitions.

(13) The 59% figure is the sum of the last row of columns (11) and (13) from Table 4.

Table 4

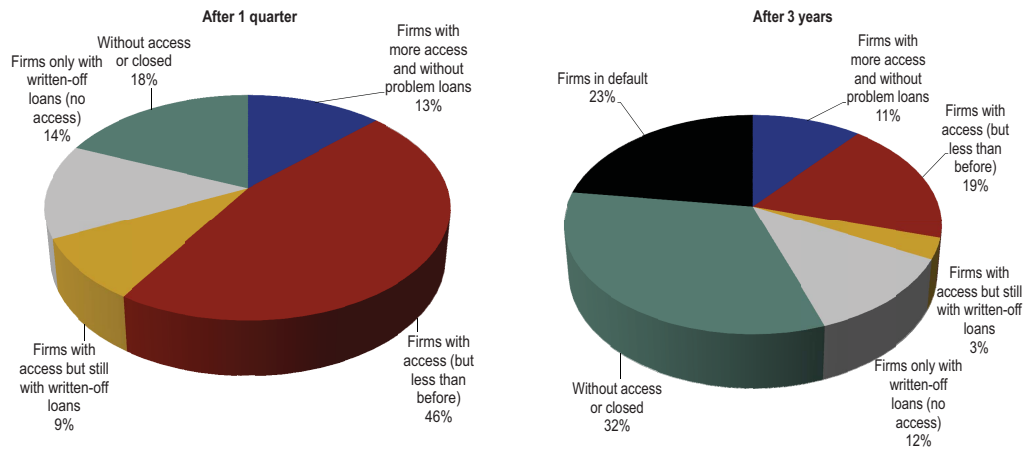
AFTER LEAVING DEFAULT

| | 1 quarter after first default episode ends | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------|--|---|---|--|-----------------------|------------|-----------------------|--|------------|------------|------------|--|------------|--|------------|-------------|------------------------|--|------------|-------------|------------|--|------------|-------------|------------|---|------------|-------------|------------|--------------------------|------------|-------------|------------|------|-----|-----|-----|-------|------|-----|------|-------|------|-----|-----|-----|-----|-------|------|-----|------|-------|------|-----|-----|-----|------|-----|------|-----|------|-------|------|-----|-----|-----|------|-----|------|-------|------|-------|------|-----|-----|-----|-----|-------|------|-------|------|-------|------|-----|-----|-----|-----|-------|------|-----|------|-------|------|-----|------|-----|------|-----|-----|-------|------|-----|------|-------|------|-----|------|-----|-----|-------|------|-----|------|-------|------|-------|------|-----|-----|-------|------|-------|------|-------|------|-------|------|-----|------|-------|------|-----|-----|-------|------|-------|------|-----|-----|-------|------|-------|------|-------|------|-------|------|--------|------|--------|------|-------|-----|--------|------|--------|------|
| | In credit register | | | | | | | | | | | | | | | | Not in credit register | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Number of default episodes resolved | Default episodes resolved as a % of defaults in each year | Number of default episodes resolved (only first defaults) | Firms that continue in the credit register in the quarter after their first default ends | % of total (column 3) | Number (4) | % of total (column 3) | Firms that record a new default episode in the 3 years after exiting default | % of total | Number (8) | % of total | Firms that are not in the CRC in the 3 years after exiting default | % of total | Firms with more access and without problem loans | % of total | Number (10) | % of total | Firms with access (but less than before) | % of total | Number (12) | % of total | Firms with access but still with written-off loans | % of total | Number (14) | % of total | Firms only with written-off loans (no access) | % of total | Number (16) | % of total | Without access or closed | % of total | Number (18) | % of total | (19) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1995 | 5 880 | 10.6 | 2 222 | 1 764 | 79.4 | 1 223 | 55.0 | 225 | 10.1 | 330 | 20.5 | 780 | 48.4 | 27 | 1.7 | 17 | 1.1 | 458 | 28.4 | 641 | 16.5 | 1 748 | 44.9 | 313 | 8.0 | 49 | 1.3 | 1 145 | 29.4 | 604 | 16.5 | 1 692 | 46.2 | 176 | 4.8 | 130 | 3.5 | 1 062 | 29.0 | 538 | 11.6 | 1 701 | 36.7 | 209 | 4.5 | 396 | 8.5 | 1 788 | 38.6 | 761 | 20.0 | 1 533 | 40.2 | 367 | 9.6 | 451 | 11.8 | 698 | 18.3 | 545 | 15.3 | 1 624 | 45.6 | 238 | 6.7 | 487 | 13.7 | 668 | 18.8 | 1 189 | 18.2 | 3 149 | 48.2 | 582 | 8.9 | 462 | 7.1 | 1 149 | 17.6 | 1 091 | 16.2 | 3 713 | 55.0 | 471 | 7.0 | 466 | 6.9 | 1 012 | 15.0 | 957 | 13.4 | 3 950 | 55.3 | 735 | 10.3 | 977 | 13.7 | 752 | 9.8 | 3 674 | 48.0 | 873 | 11.4 | 1 438 | 18.8 | 918 | 12.0 | 577 | 8.6 | 3 274 | 49.0 | 685 | 10.2 | 1 076 | 16.1 | 1 074 | 16.1 | 662 | 7.9 | 3 149 | 37.4 | 1 185 | 14.1 | 2 352 | 27.9 | 1 081 | 12.8 | 985 | 11.5 | 3 800 | 44.4 | 676 | 7.9 | 1 442 | 16.8 | 1 659 | 19.4 | 920 | 9.6 | 4 235 | 44.4 | 1 025 | 10.7 | 1 751 | 18.4 | 1 609 | 16.9 | 10 552 | 12.8 | 38 022 | 46.1 | 7 355 | 8.9 | 11 252 | 13.6 | 15 298 | 18.5 |
| Total | 144 313 | 12.8 | 82 479 | 67 181 | 81.5 | 28 025 | 48.3 | 5 602 | 9.7 | 10 552 | 12.8 | 38 022 | 46.1 | 7 355 | 8.9 | 11 252 | 13.6 | 15 298 | 18.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Sources: Banco de Portugal and authors' calculations.

Chart 4

DISTRIBUTIONS OF POSSIBLE OUTCOMES AFTER EXITING DEFAULT



Sources: Banco de Portugal and authors' calculations.

from the CRC after default (from 18 to 32 per cent), as well as by the firms that re-enter default (23 per cent after 3 years have gone by).

In Charts 5 and 6 we depict the survival functions for the two access definitions. In both cases, most firms regain access almost immediately. In the stricter access definition (Chart 5), we observe that the firms that regain access are able to do it very soon after the default ended. Access rates are high during the first quarters and then stabilize at very low values. If the firm does not show an increase in bank loans in the first quarters after the default is cleared, it is very unlikely that it will ever do. In fact, almost 60 per cent of the firms never regain access to new bank loans.

When the broader definition of access is considered, the results are fairly similar. However, in this case the time of exclusion is even shorter. Most firms are able to regain access immediately. The probability of regaining access decreases dramatically in the second quarter after default ended. Around 25 per cent of the firms never regain access to bank loans (Chart 6).

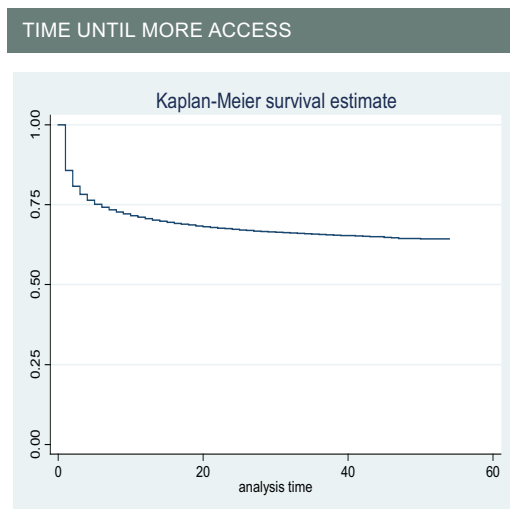
Hence, regardless of the access definition used, we observe that when a firm is not able to regain access soon after the default is cleared, the probability that it will ever be able to do so becomes very low.

In order to better understand why some firms are able to regain access relatively fast after exiting default, we estimate a Cox proportional hazard model for the time until access, such that:

$$h(t, X_i) = k(X_i, \beta) h_0$$

where $k(\cdot)$ is a non-negative function of X_i and β , the vectors of covariates and parameters, and h_0 is the baseline hazard. In this model, the baseline hazard is common to all firms and individual hazard functions differ from each other proportionally, with $k(\cdot)$ representing the factor of propor-

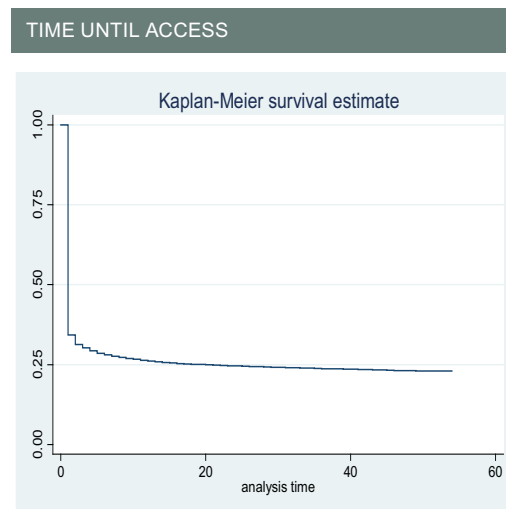
Chart 5



Source: Banco de Portugal and authors' calculations.

Note: Analysis time defined as quarters since the end of the first default episode. The survivor estimate is defined as the probability of regaining access after default at t : $S(t) = \text{Prob}(T \geq t) = 1 - F(t)$. More access is defined as having a larger amount of outstanding bank loans (including credit lines) than at the end of the default episode and not having any record of default or write-offs.

Chart 6



Sources: Banco de Portugal and authors' calculations.

Note: Analysis time defined as quarters since the end of the first default episode. The survivor estimate is defined as the probability of regaining access after default at t : $S(t) = \text{Prob}(T \geq t) = 1 - F(t)$. Access is defined as having a positive amount of outstanding bank loans (including credit lines) without any record of default or write-offs, after having left default.

tionality. One advantage of this method is that it is a semi-parametric approach, thus allowing us to estimate β without specifying the form of the baseline hazard. Under this setup, the regressors do not affect the shape of the overall hazard function, conditioning only the relative failure risk of each firm. The failure risk is defined as the time until a firm regains access to credit (using our two different access definitions) after it has overcome its first default episode.

The estimation results are shown in Table 5. Columns (1) to (4) refer to the broad access definition, whereas columns (5) to (8) consider the strict definition. The columns differ in the time controls used, as discussed below. In these regressions, an estimated coefficient lower than 1 should be interpreted as contributing to a longer time until access (and the opposite for a coefficient above 1).

Taking the total amount of credit outstanding as a proxy for firm size, we observe that larger firms regain access faster (columns (1) to (4)). However, this result is not strongly statistically significant when we consider the time it takes a firm to regain access to a new bank loan after default (columns (5) to (8)). The intensity of the default episode is a key determinant in the process of regaining access: firms that recorded higher credit overdue ratios and higher loss rates take more time to regain access to credit, especially in the broad definition. The impact of default duration goes in the same direction, but now the effect is stronger for the stricter access definition, *i.e.*, a longer default harms the ability of firms to have access to new bank loans.

The choice of the number of bank relationships also seems to influence how easily firms regain access after default, though only in the broader definition.¹⁴ Firms that borrow from more banks take

(14) The results for the stricter definition are not statistically significant at a 5% level.

Table 5

| COX REGRESSIONS: DETERMINANTS OF TIME UNTIL ACCESS | | | | | | | | |
|--|--|---------------|---------------|---------------|---|---------------|---------------|---------------|
| | Failure event: access (broad definition) | | | | Failure event: access (strict definition) | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Ln Credit outstanding (ln(euros)) | 1.016 | 1.015 | 1.015 | 1.015 | 1.010 | 1.008 | 1.007 | 1.008 |
| | <i>9.76</i> | <i>9.24</i> | <i>8.83</i> | <i>9.29</i> | <i>2.10</i> | <i>1.73</i> | <i>1.58</i> | <i>1.74</i> |
| Credit overdue ratio (%) | 0.993 | 0.993 | 0.993 | 0.993 | 0.998 | 0.997 | 0.997 | 0.997 |
| | <i>-61.40</i> | <i>-63.49</i> | <i>-63.61</i> | <i>-63.47</i> | <i>-6.11</i> | <i>-9.83</i> | <i>-10.34</i> | <i>-9.83</i> |
| Loss rate (%) | 0.974 | 0.974 | 0.974 | 0.974 | 0.980 | 0.980 | 0.980 | 0.980 |
| | <i>-37.74</i> | <i>-37.62</i> | <i>-37.73</i> | <i>-37.61</i> | <i>-20.14</i> | <i>-19.99</i> | <i>-19.93</i> | <i>-19.99</i> |
| Duration of default (quarters) | 0.937 | 0.939 | 0.940 | 0.939 | 0.921 | 0.927 | 0.928 | 0.927 |
| | <i>-48.85</i> | <i>-47.26</i> | <i>-46.51</i> | <i>-47.24</i> | <i>-28.25</i> | <i>-26.26</i> | <i>-25.79</i> | <i>-26.25</i> |
| No. of bank relationships | 0.957 | 0.956 | 0.957 | 0.956 | 1.010 | 1.008 | 1.007 | 1.008 |
| | <i>-23.71</i> | <i>-24.07</i> | <i>-23.98</i> | <i>-24.09</i> | <i>1.85</i> | <i>1.45</i> | <i>1.40</i> | <i>1.44</i> |
| No. of bank relat. in default % of total | 0.996 | 0.996 | 0.996 | 0.996 | 0.994 | 0.994 | 0.994 | 0.994 |
| | <i>-31.97</i> | <i>-31.03</i> | <i>-30.87</i> | <i>-31.04</i> | <i>-15.78</i> | <i>-15.22</i> | <i>-15.06</i> | <i>-15.22</i> |
| Default with main bank (binary) | 1.058 | 1.063 | 1.063 | 1.063 | 0.877 | 0.896 | 0.898 | 0.896 |
| | <i>11.86</i> | <i>12.75</i> | <i>12.61</i> | <i>12.80</i> | <i>-8.02</i> | <i>-6.69</i> | <i>-6.58</i> | <i>-6.68</i> |
| Recession (binary) | - | - | - | 1.092 | - | - | - | 1.103 |
| | - | - | - | <i>6.25</i> | - | - | - | <i>1.86</i> |
| D_1996 | - | 1.145 | - | 1.145 | - | 1.421 | - | 1.421 |
| | - | <i>13.82</i> | - | <i>13.82</i> | - | <i>10.03</i> | - | <i>10.04</i> |
| D_1997 | - | 1.170 | - | 1.170 | - | 1.335 | - | 1.335 |
| | - | <i>16.00</i> | - | <i>16.00</i> | - | <i>8.28</i> | - | <i>8.28</i> |
| D_1998 | - | 1.159 | - | 1.159 | - | 1.424 | - | 1.425 |
| | - | <i>14.51</i> | - | <i>14.51</i> | - | <i>10.59</i> | - | <i>10.59</i> |
| D_1999 | - | 0.977 | - | 0.977 | - | 1.515 | - | 1.515 |
| | - | <i>-2.00</i> | - | <i>-2.00</i> | - | <i>13.21</i> | - | <i>13.21</i> |
| D_2000 | - | 1.010 | - | 1.010 | - | 1.326 | - | 1.326 |
| | - | <i>0.96</i> | - | <i>0.96</i> | - | <i>8.47</i> | - | <i>8.47</i> |
| D_2001 | - | 1.040 | - | 1.040 | - | 1.485 | - | 1.485 |
| | - | <i>4.78</i> | - | <i>4.79</i> | - | <i>14.31</i> | - | <i>14.31</i> |
| D_2002 | - | 0.996 | - | 0.996 | - | 1.226 | - | 1.226 |
| | - | <i>-0.48</i> | - | <i>-0.48</i> | - | <i>7.37</i> | - | <i>7.37</i> |
| D_2003 | - | 1.039 | - | 0.952 | - | 0.967 | - | 0.877 |
| | - | <i>4.99</i> | - | <i>-3.10</i> | - | <i>-1.14</i> | - | <i>-2.18</i> |
| D_2004 | - | 0.932 | - | 0.912 | - | 0.852 | - | 0.831 |
| | - | <i>-8.28</i> | - | <i>-9.76</i> | - | <i>-5.29</i> | - | <i>-5.56</i> |
| D_2005 | - | 0.990 | - | 0.990 | - | 0.856 | - | 0.856 |
| | - | <i>-1.10</i> | - | <i>-1.10</i> | - | <i>-4.96</i> | - | <i>-4.96</i> |
| D_2006 | - | 0.951 | - | 0.951 | - | 0.916 | - | 0.916 |
| | - | <i>-5.47</i> | - | <i>-5.47</i> | - | <i>-2.89</i> | - | <i>-2.89</i> |
| D_2007 | - | 0.982 | - | 0.982 | - | 1.085 | - | 1.085 |
| | - | <i>-2.25</i> | - | <i>-2.25</i> | - | <i>2.92</i> | - | <i>2.92</i> |
| Quarter dummies | N | N | Y | N | N | N | Y | N |
| Number of subjects | 73 980 | 73 980 | 73 980 | 73 980 | 73 980 | 73 980 | 73 980 | 73 980 |
| Number of failures | 54 282 | 54 282 | 54 282 | 54 282 | 21 055 | 21 055 | 21 055 | 21 055 |
| Time at risk | 384 240 | 384 240 | 384 240 | 384 240 | 893 125 | 893 125 | 893 125 | 893 125 |
| Log-likelihood | -589 282 | -589 180 | -589 097 | -589 177 | -226 434 | -226 022 | -225 864 | -226 020 |

Sources: Banco de Portugal and authors' calculations.

Notes: z-scores in italics. All models estimated using a Cox regression that evaluates the time until access using robust variance estimates. An estimated coefficient lower than 1 should be interpreted as contributing a longer time until access. In columns (1) - (4), the dependent variable is the time until access using the broad definition. In columns (5) - (8) it is considered the strict definition of access. All explanatory variables are defined as in previous tables and refer to the last period of default.

more time to regain access to bank loans. Hence, engaging in single bank relationships may provide some benefits for firms in financial distress.¹⁵ Moreover, firms that were defaulting on a larger percentage of existing bank relationships take more time to regain access to credit, which may also be regarded as evidence that more severe default episodes lead to a more prolonged exclusion from credit markets.

Finally, in what concerns defaulting with the firms' main lender, the results are rather mixed: firms that default with their main bank seem to have more difficulties in having access to new loans, but the opposite is seen when the broad definition is considered. This result is probably driven by the way we define access in the latter case: as mentioned before, we consider that a firm regains access when it records a positive amount of credit outstanding without having any problem loans. Thus, if a firm defaults for a given period of time and at some point it is able to repay the debt overdue, we consider that the firm has regained access. As we observe that most firms actually default with their main lender, the time it takes to regain access may be mechanically driven by this feature of the data.

As mentioned above, the different columns in Table 5 consider essentially the same explanatory variables, with the exception of the time controls. Time effects seem to play a relevant role: firms that emerged from default in the earlier years of our sample took less time to regain access to credit than firms that defaulted in more recent years. In order to better explore these effects, in columns (4) and (8) we include a binary variable for recession years. We find that firms that exit default during recessions are able to regain access to bank loans sooner, controlling for all other default and loan characteristics. This is an interesting result, as it may suggest that when a firm is able to resolve a default during adverse times, banks perceive this as being a signal of the quality and strength of the firm.¹⁶ In particular, banks possibly consider that these firms are of higher quality (in terms of creditworthiness) and therefore grant credit faster than if the default resolution had happened in non-recession years.¹⁷ Moreover, these firms are more likely to have defaulted due to an exogenous systematic shock than due to idiosyncratic fragilities, thus supporting this creditworthiness assessment by banks.

The shapes of the survival functions (Charts 5 and 6) show that there is significant right-censoring in our data, especially in the stricter access definition: around 25 per cent of the firms never regain access to loans after default and almost 60 per cent never regain access to new bank loans. This pattern suggests that we are dealing with defective risks or infinite durations, as some firms will never be able to regain access. As noted by Addison and Portugal (2003), the presence of defective risks may lead to inconsistent estimates of the hazard regression coefficients. To address this issue, we estimated

(15) For instance, Carmignani and Omiccioli (2007) argue that the overall effect of more concentrated banking relationships is a lower probability of liquidation, but a higher probability of financial distress. In turn, Elsas and Krahnert (1998) show that when there are strong bank-customer relationships, banks provide liquidity insurance to firms in financial distress.

(16) For robustness purposes, we also considered the effect of entering default during a recession on the time it takes until firms regain access to credit, but the results are not statistically significant. In addition, we also tried to consider simultaneously the effect of entering and/or leaving default during a recession, plus an interaction between these two possibilities (i.e., a binary variable that takes the value 1 when the firm enters and leaves default during a recession). If this is the case, firms are able to regain access significantly faster. In contrast, firms that entered default during a recession should take more time to regain access. The effect of leaving default during a recession is not significant in this specification.

(17) Acharya *et al.* (2007) study the impact of industry-wide distress on the recoveries of defaulted firms in the US and find that defaulting firms that belong to industries in distress are more likely to spend more time in bankruptcy. However, these firms are also more likely to be restructured than to be acquired or liquidated.

all the regressions displayed in Table 5 conditional on the firms regaining access (under each of our access definitions) during the sample period. This amounts to fully eliminating right censoring in our sample: all firms eventually “fail”, that is, they reach the failure event with probability one.¹⁸ The results for the broad access definition are not qualitatively different from those obtained with unconditional estimation, but there are some small differences for the stricter definition of access. First, the positive influence of firm size on the reduction of the time until the firm obtains a new loan becomes more economically and statistically significant (whereas with unconditional regressions this variable was significant only at a 10 per cent level). Second, the result regarding firms that default with their main lender changes its sign: conditional on obtaining a new loan, firms that have defaulted with their main lender are able to regain access faster. Hence, defaulting with the main lender affects negatively the likelihood of obtaining a new loan, but not the time it takes for that to happen.

Another dimension of post-default behaviour that deserves to be explored is whether firms regain access with the banks that were previously lending to them or if they are able to establish new bank relationships. In Table 6 we provide some evidence on that issue.

In the quarter immediately after the default episode is cleared, we saw before that 13 per cent of the firms have access to a new bank loan (Table 4). From these firms, almost one third obtains that loan from a new bank (column (3), Table 6). This percentage was higher in the first years of the sample period. When we examine this situation one and three years after default, we observe that the percent-

Table 6

| REGAINING ACCESS THROUGH NEW BANKS | | | | | | | | | |
|------------------------------------|------------------------|--|-------------|------------------------|--|-------------|------------------------|--|-------------|
| | After 1 quarter | | | After 1 year | | | After 3 years | | |
| | Firms with more access | Firms with more access and with a new bank | % | Firms with more access | Firms with more access and with a new bank | % | Firms with more access | Firms with more access and with a new bank | % |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| 1995 | 330 | 136 | 41.2 | - | - | - | - | - | - |
| 1996 | 641 | 226 | 35.3 | 356 | 210 | 59.0 | - | - | - |
| 1997 | 604 | 200 | 33.1 | 467 | 282 | 60.4 | - | - | - |
| 1998 | 538 | 214 | 39.8 | 529 | 291 | 55.0 | 349 | 265 | 75.9 |
| 1999 | 761 | 227 | 29.8 | 534 | 318 | 59.6 | 505 | 371 | 73.5 |
| 2000 | 545 | 223 | 40.9 | 469 | 292 | 62.3 | 564 | 424 | 75.2 |
| 2001 | 1 189 | 559 | 47.0 | 541 | 385 | 71.2 | 569 | 481 | 84.5 |
| 2002 | 1 091 | 412 | 37.8 | 1 239 | 811 | 65.5 | 411 | 342 | 83.2 |
| 2003 | 957 | 262 | 27.4 | 766 | 432 | 56.4 | 456 | 388 | 85.1 |
| 2004 | 752 | 188 | 25.0 | 670 | 389 | 58.1 | 997 | 804 | 80.6 |
| 2005 | 577 | 171 | 29.6 | 630 | 375 | 59.5 | 719 | 562 | 78.2 |
| 2006 | 662 | 160 | 24.2 | 547 | 322 | 58.9 | 657 | 509 | 77.5 |
| 2007 | 985 | 266 | 27.0 | 652 | 366 | 56.1 | 629 | 506 | 80.4 |
| 2008 | 920 | 177 | 19.2 | 892 | 464 | 52.0 | 542 | 427 | 78.8 |
| Total | 10 552 | 3 421 | 32.4 | 8 292 | 4 937 | 59.5 | 6 398 | 5 079 | 79.4 |

Sources: Banco de Portugal and authors' calculations.

Notes: Firms with more access are those with more outstanding bank loans (including credit lines) than at the end of the default episode and without any record of default or write-offs. Firms with more access and with a new bank defined as those borrowing from a bank which was not a lender when the default episode ended. Only firms with less than 9 bank relationships are considered.

(18) The results are not presented in this article but are available upon request.

age of firms that were able to obtain a loan from a new lender increases markedly (60 per cent after one year and 80 per cent after 3 years).

These results must be analysed bearing in mind that the Portuguese Credit Register is designed to be an information sharing mechanism between banks. When a firm defaults on a bank loan, the other banks currently lending to that firm can observe that. Their prospective lenders can also ask to have access to that information, with the firms' consent, what is usually the common procedure. Notwithstanding this, banks seem to be generally willing to give firms a second chance.

6. CONCLUDING REMARKS

In this paper we investigated what happens to firms after they default on their bank loan obligations. What happens to firms while they are in default? How many firms are able to overcome financial distress and regain access to bank credit? Which default characteristics influence these outcomes? We focused our analysis in two different moments: the "in default" and the "post default" periods.

With respect to the "in default" period we find that i) if a default episode is not resolved within the first quarters, then it may take a long time to be overcome; ii) the duration of default is linked to its severity, that is, the more significant the default is, the longer it takes to be resolved; iii) only 31 per cent of default events lead to loan write-offs; iv) of those loans that lead to a write-off, the average loss for the bank is 34 per cent.

Regarding the "post default" period our results show that i) in the first quarter after exiting default, 59 per cent of firms have access to credit, but of these, only less than one quarter of the firms was able to increase its bank debt; ii) if a firm is not able to regain access to credit in the first year after exiting default then the likelihood of obtaining credit is less than 1 per cent; iii) after three years of resolving the default, almost 25% of firms were again defaulting on their bank loan(s); iv) the duration of exclusion is strongly related to the severity of the default episode. That is, the larger the amount defaulted on, the larger the written-off amount, and the longer the default period, the longer the period of exclusion will be; v) firms that are able to exit default during recession periods regain access to credit faster.

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